U.S. Navy Mine Countermeasures

National Defense Industrial Association
13th Expeditionary Warfare Conference
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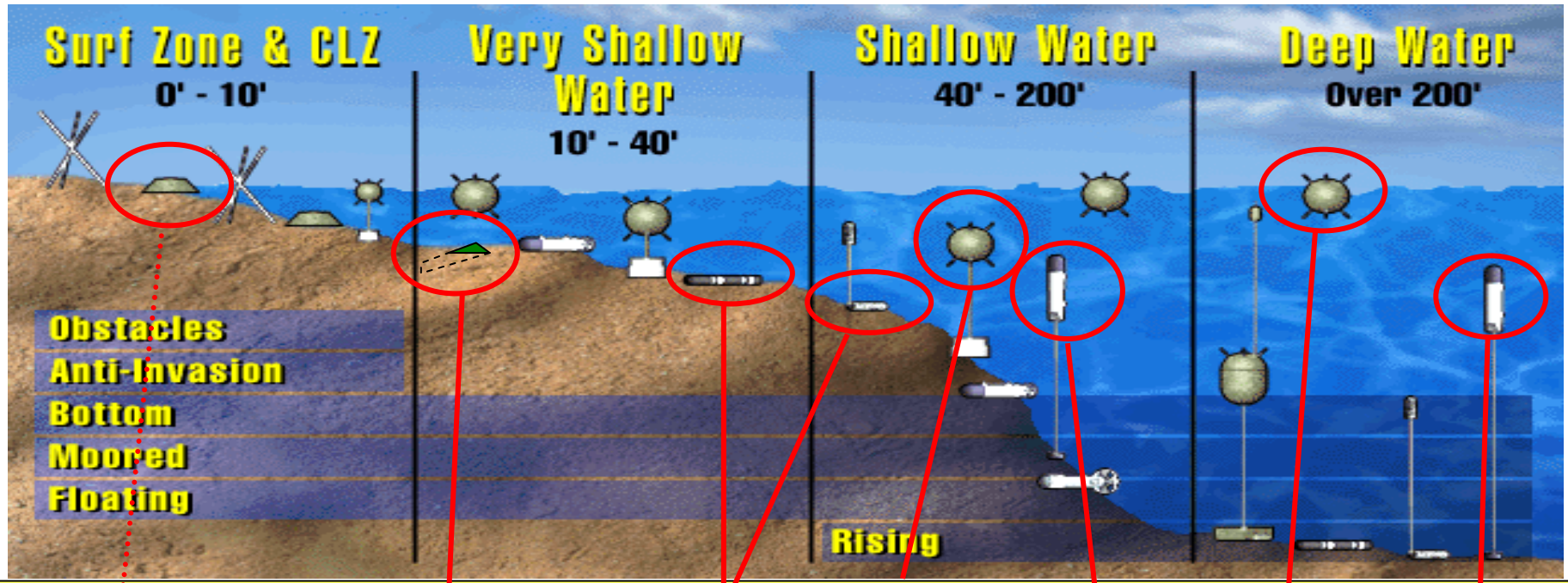
CDR Dave Hebert
Mine Warfare Branch Head (N852)

Agenda

- **Mine Threat**
- **The Transition Challenge**
- **MCM Mission Package Program Overview**
- **OMCM Challenges**
- **Summary**

The Threat Across the Littorals

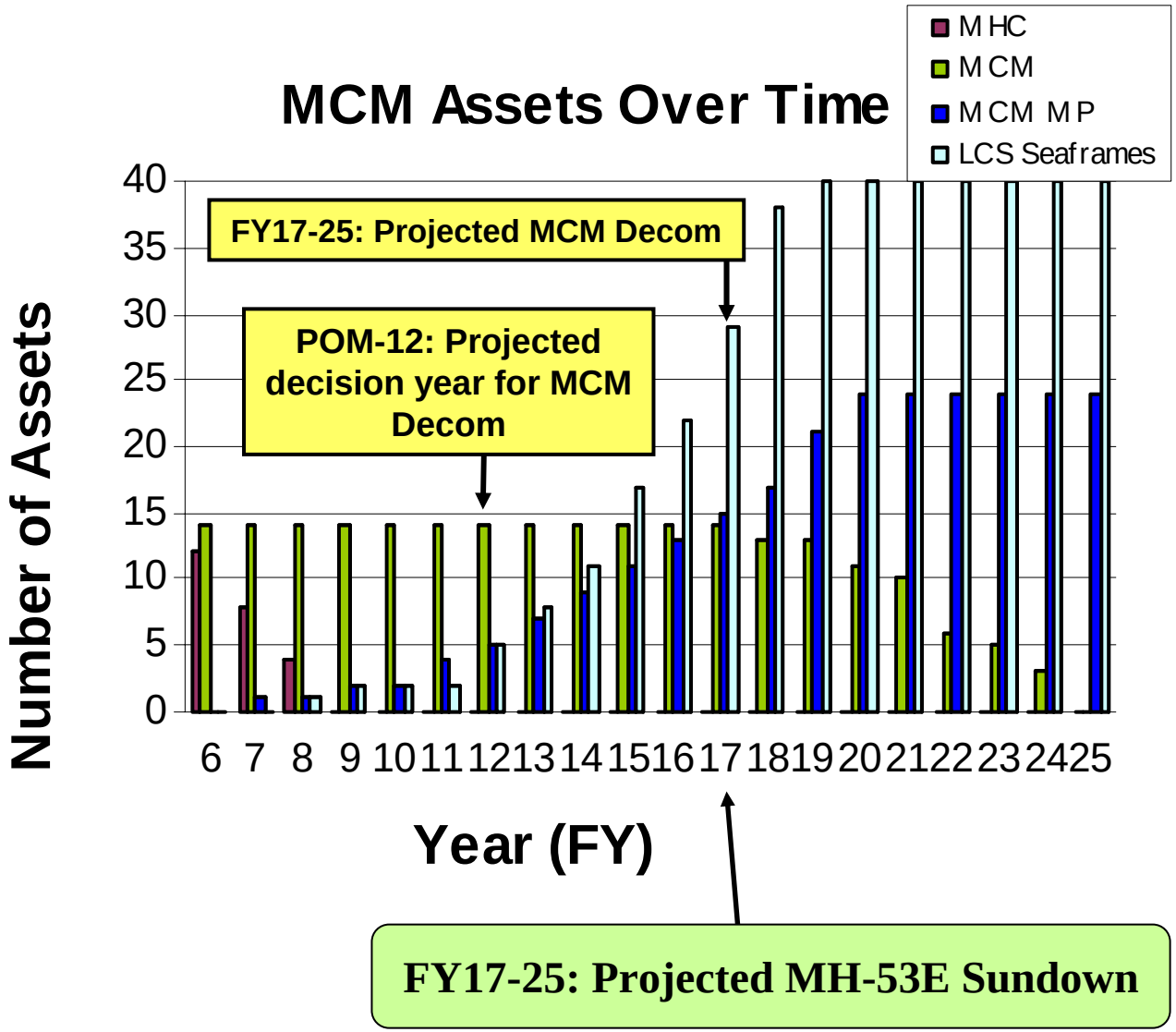


Anti-Invasion | Buried / Partially Buried | Bottom Influence | Moored Contact | Moored Influence | Floating Contact | Rising Influence

- The real goal of a minefield is Sea Denial, NOT the damage or destruction of a specific ship.
- Navy goal is Assured Access to defeat the minefield, NOT counter every mine.

- **Over 300 Mine Types**
- **Over 50 Countries Possess**
- **Low Cost**
- **Simple to Deploy**

The Organic Transition Challenge



Coverage Complete

Minefield Detection and Neutralization

Assault Breaching System

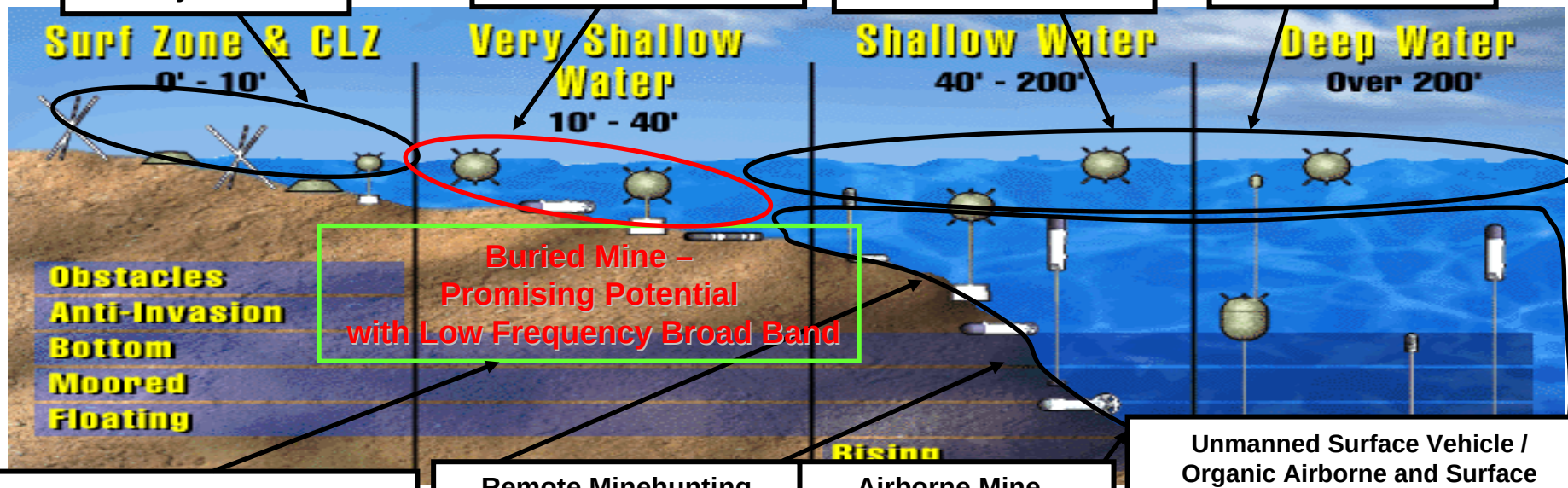
EOD Mobile Unit ONE

Laser (Hunt)

Airborne Laser Mine Detection System

Super-cavitating Projectiles (Kill)

Rapid Airborne Mine Clearance System



Surface Mine Countermeasures Unmanned Underwater Vehicle and Low Frequency Broadband

Buried Mine Detection

Remote Minehunting System & MH-60S AN/AQS20A

Sonar (Hunt)

Airborne Mine Neutralization System

Propelled explosive charges (Kill)

Unmanned Surface Vehicle / Organic Airborne and Surface Influence Sweep

Magnetic Acoustic Influence Sweep

Shallow Water to Beach Zone

Assault Breaching System

JDAM & CMS

COBRA

EOD Mobile Unit One

EOD Mobile Unit (One)

LCS MCM Mission Package

RAMICS

ALMDS

US3

RMS

UUV LFBB

BEACH

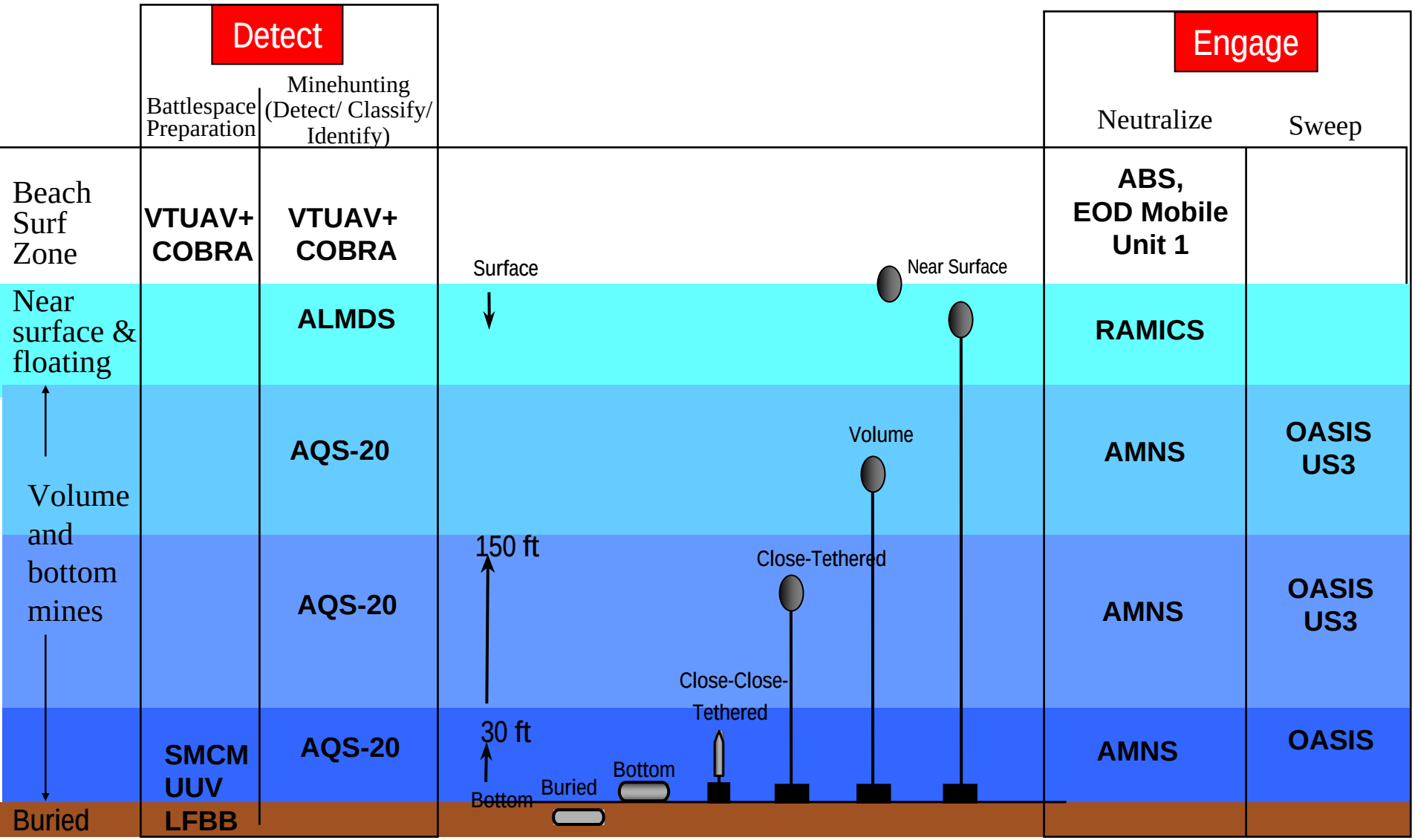
SURF

VSW

40ft

SW

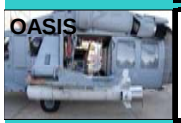
LCS MIW Mission Package: System Coverage



* NOTE : Depth Coverages Vary with System and Mine Type

UNCLASSIFED

MCM Package Sensor Status

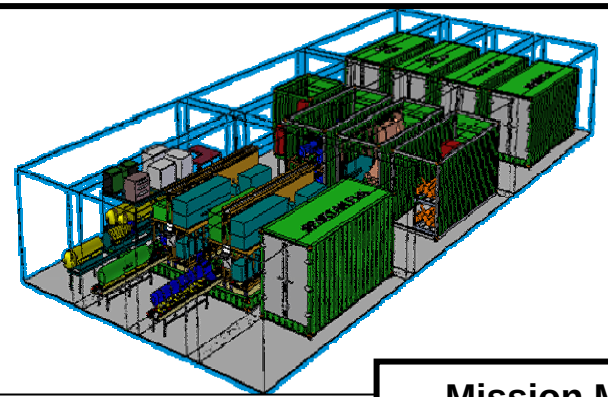
MCM Package Program	ACAT	Programmatics	Testing	Contractor	IOC
 RMS	1C	In Low Rate Initial Production	✓ TECHEVAL completed on DDG-96 Mar 07 • Op Assess on USS BAINBRIDGE 14 Sep 08	Lockheed Martin	2009
 AQS-20A	2	In Low Rate Initial Production	✓ TECHEVAL on MH-60S completed • OPEVAL w/ MH-60S Aug 09 – Oct 09	Raytheon	2010
 AMNS	2	In Low Rate Initial Production	✓ MS C Approval Jan 08 • DT Live Fire Ground Testing Jul 09	Raytheon	2010
 ALMDS	2	In Low Rate Initial Production	✓ Commenced WSIT CT on MH-60S Apr 08 • Commence TECHEVAL 2nd Qtr FY09	Northrop Grumman	2010
 OASIS	2	Milestone C: 3QFY10	✓ Re-design PDR 12 Jun 08 • MH-53E OA Sep 09	ITT Corp	2011
 RAMICS	2	Milestone C: 4QFY10	• MH-60S Captive Carriage & Jettison OCT 08 • Lake Glendora II Ground Testing Oct-Dec 08	Northrop Grumman	2011
 COBRA	3	Milestone C: Jan 09	✓ Started Performance Validation (MH-53E) • Integration flight tests on VTUAV Oct 09	Northrop Grumman	2010
 CMS	3	Milestone C: FY14	✓ SD&D Contract awarded 24 Jul 08 • System Requirements Review 1st Qtr FY09	Boeing	2015
 US3	3	Milestone C: 4QFY10	✓ Sweep Gear integration test on USV Jul 08 • End to End US3/USV/MP test Oct 08	TBD	2014
 UUV LFBB	TBD	Milestone B: 2QFY09	• CDD in Navy Staffing	TBD	2015

MCM Mission Package Evolution

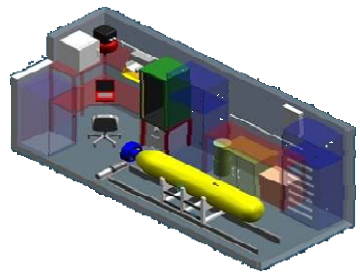
MCM MM Delivery

MCM MP 1 Spiral Alpha Modules	USV w/USSS (x1) (EDM) RMMV (x1) (EDM) AMNS (x1) (EDM) ALMDS (x1) (LRIP) AN/AQS-20A (x2) (LRIP) UUV (x2) (EDM) Support Equipment	FY07 Delivered
MCM MP 2 Spiral Alpha Modules	USV w/USSS (x1) (EDM) RMMV (x2) (LRIP) AMNS (x1) (LRIP) ALMDS (x1) (LRIP) AN/AQS-20A (x3) (LRIP) Support Equipment	FY09
MCM MP 3-4 Spiral Alpha Modules	USV w/USSS (x1) (LRIP) RMMV (x2) (Production) OASIS (x1) (LRIP) AMNS (x1) (LRIP) ALMDS (x1) (LRIP) AN/AQS-20A (x3) (Production) COBRA (x1) (LRIP) Support Equipment	FY11
MCM MP 5 Alpha Module Baseline	USV w/USSS (x1) (LRIP) RMMV (x2) (Production) OASIS (x1) (Production) AMNS (x1) (Production) ALMDS (x1) (Production) AN/AQS-20A (x3) (Production) COBRA (x1) (Production) RAMICS (x1) (LRIP) Support Equipment	FY12
MP X Spiral Bravo Modules	Systems x,y,z Support Equipment	Future

Mission Package



Mission Module



Legend

Systems Added/Matured

Delivered

OMCM Challenges

Our most mature programs face many challenges (RMS, AQS-20A & ALMDS in or near Operational testing)

- **Sensor False Alarms**
  - SONAR – (HFWB, LFBB)
  - LIDAR – (ALMDS, RAMICS, COBRA)
    - New Data type; New viewers; Learning curve
    - High False Alarms mean longer PMA & higher False classification by PMA Operator
  - CAD/CAC – improvements needed
    - Real time algorithms in Common Console?
    - Post mission via OPMA?

- **Reliability (Ao, MTBOMF)**
  - Sensor Reliability needs to meet ORD or CPD
  - Support Equipment Reliability (CSTRS, Common Tow Cable) needs improvement

- **WorkLoad / Crew Limitations**
  - Streaming and Recovery of towed systems (high workload)
  - PMA takes long time (Fatigue adds to problem)
  - Learning Curve with new data types

Summary

- The Mine threat is real and not getting easier

- The transition to Organic MCM will have its challenges; therefore, the Navy needs Industry's help in meeting Organic IOC and preservation of current forces
  - ✓ MCM upgrades
  - ✓ MH-53 Flex

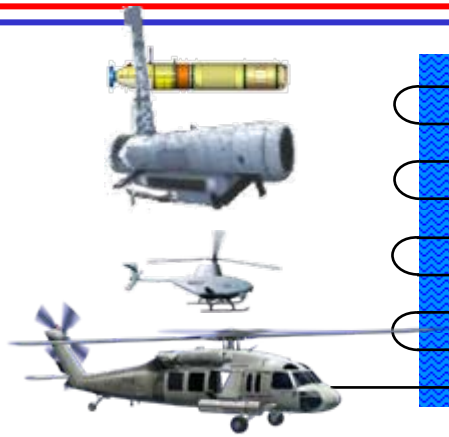
- MCM Mission Package program making progress

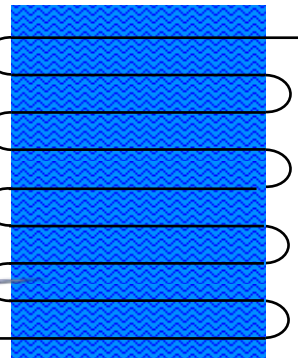
- We must make smart investments to reduce false alarms as they drive the Detect to Neutralize timeline

Questions?

BackUp

False Alarms Lengthen Kill Chain





Contact List

Develop Search Mission Plan
- MEDAL
- MPS

MH-60S
-ALMDS
RMS
- AQS-20A
UUV LFBB
COBRA

Sortie Data Collection

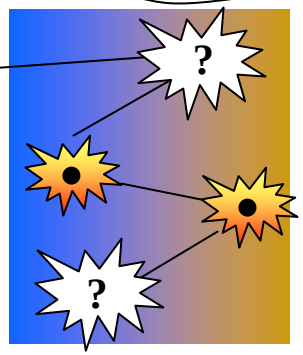
Post Mission Analysis

False Alarms

False Classification

False Calls

Detection



Develop Neutralization Mission Plan

MH-60S
- AMNS
-RAMICS
ABS

MH-60S
- OASIS
- USV Sweep

False Calls in Mission Plan

NMLOs

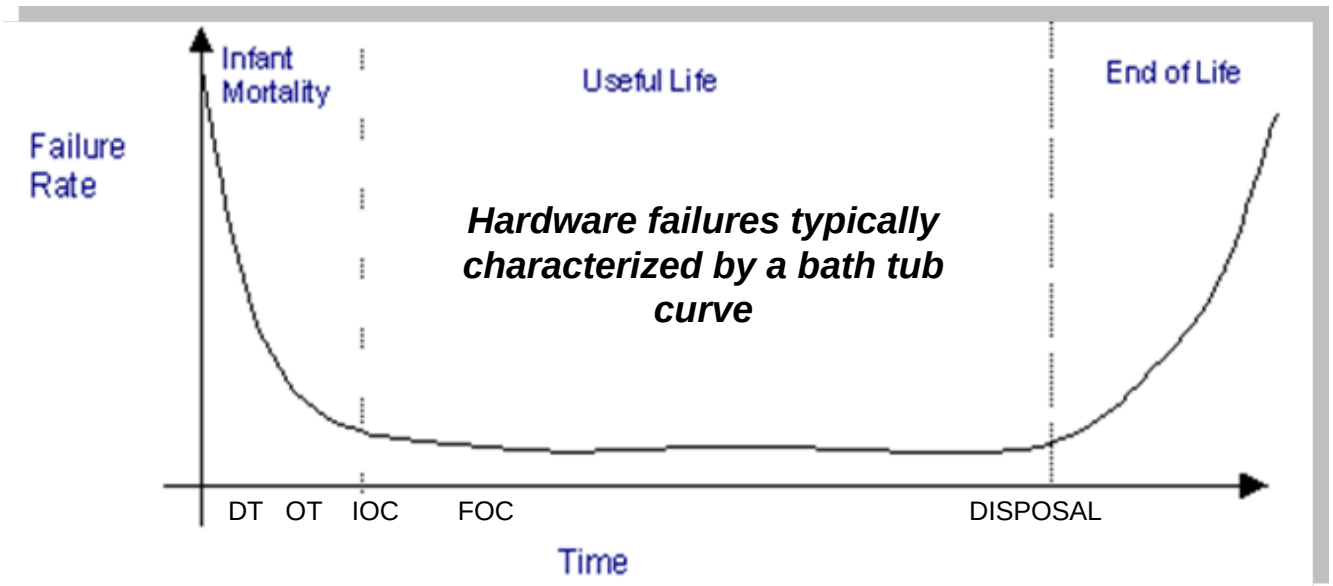
Neutralization

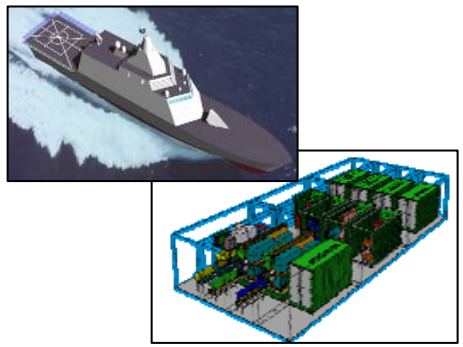
Sweep

Reliability

$$Ao = \frac{Uptime}{Uptime + Downtime} = \frac{MTBF}{MTBF + (MTTR + MLDT)}$$

Mean Time to Repair & Mean Logistics Delay Time:
Number of systems on LCS and O to D level maintenance philosophy





MCM Mission Package

2 RMMV	1 AMNS
3 AQS-20A	1 US3
1 ALMDS	1 COBRA
1 OASIS	1 VTUAV
1 RAMICS	1 MH-60S

All MCO timelines are driven by required MTBF, so we must improve upon reliability to meet the requirements and increase useful life!